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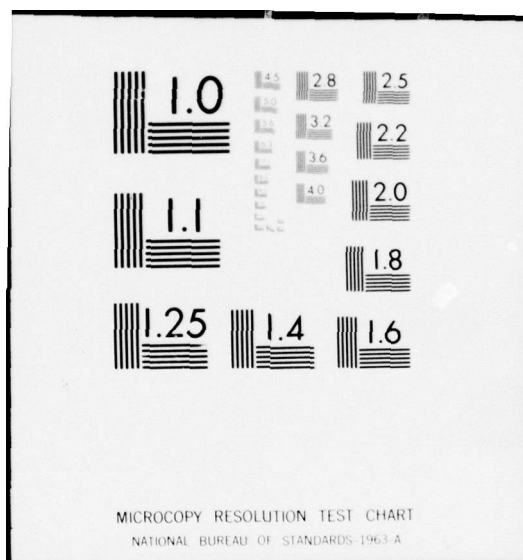


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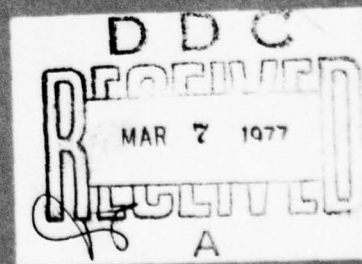
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① NW  
Book 7  
Transportation Data

# Seafarer Site Survey Upper Michigan Region

for  
U.S. Navy  
Naval Electronic Systems Command  
Washington, D.C.

by  
EDAW inc.  
under contract to  
GTE Sylvania  
Communication Systems Division



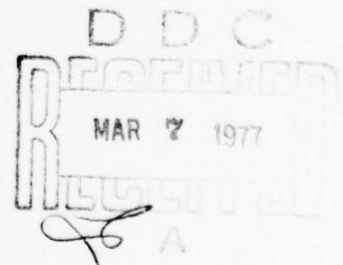
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BOOK 7

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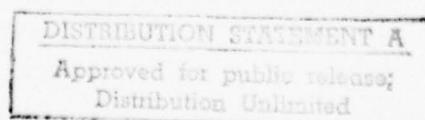
for  
U. S. Navy. Naval Electronic Systems Command



by  
EDAW, Inc., 50 Green Street, San Francisco 94111

Under Contract to  
GTE Sylvania, Communication Systems Division

April, 1976





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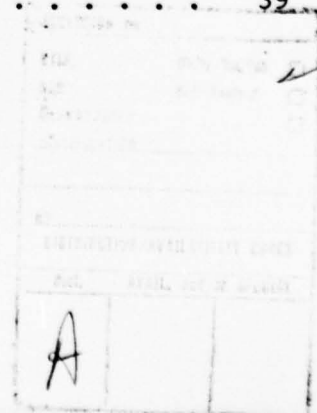
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## SUMMARY

The Study Area's transportation system is limited due to its distant location from major population and market centers. This is evident in the lack of passenger service by rail or water, limited bus and air service, and the scarcity of multilane highways.

The few existing major arteries generally have a north-south or east-west orientation connecting the major urban areas. The east-west highways are used by through traffic as well as traffic which is destination-oriented. North-south routes are primarily destination-oriented and accordingly show a lower 24-hour traffic flow. Gravel and unsurfaced two-lane roads compose a large percentage of the highway system.

Air transportation in the Upper Peninsula is limited. Two commercial airports located in Marquette and Iron Mountain are within the Study Area boundary. Three other commercial airports in Houghton, Escanaba and Menominee are close enough to service parts of the Study Area. Flights originating from these airports are basically feeder links, north-south to Green Bay, Wisconsin and east-west to Duluth, Minnesota. A small commuter airline servicing Houghton and Marquette offers some connection to lower Michigan and Detroit.

The Study Area has three general aviation airports (that is, publically owned airports without scheduled passenger service) while two other such airports outside the boundary can also service the Study Area. They have limited capacities which are not expected to significantly increase in the future.

There are six railroad companies presently operating in the Study Area. The lines mainly transport bulk commodities to and from the ports of Presque Isle and Marquette which are inside the Study Area and Escanaba which is to the south. The highest concentration of railroad activity is in the iron mining district around Ishpeming.

Marquette and Presque Isle are the only active deep draft harbors in the Study Area. The vast majority of their business is in the shipping and receiving of the following bulk commodities: iron ore, coal, and petroleum products.

Increased mining activity in the Upper Peninsula has led to an increase in barge traffic from the two deepwater harbors in the Study Area. The Marquette Harbor is rebuilding its coal pier to handle the shipments of coal needed by the new electrical power plant that services Tilden Mine and the Marquette area.

No major alteration to the Upper Peninsula's transportation system is expected in the next few years. The Michigan Aeronautic Commission has proposed three new general aviation airports to be constructed by 1983. The Department of State Highways and Transportation is presently studying the present highway system within the Study Area and the rest of the Upper Peninsula for future highway alignments. The deepwater harbors have the capacity to handle the expected future increase in barge traffic.



## EVOLUTION

### Processes and Time Leading to Existing Conditions

#### Roads

The western Upper Peninsula has not experienced the economic and population growth of lower Michigan. The road system illustrates the undeveloped state of the region. The majority of the system is either gravel or dirt roads. Many of the dirt roads are little more than unmaintained paths that are infrequently used by the public. While the interstate highway system is quite extensive in lower Michigan, the Upper Peninsula has only one interstate highway, I-75, which is located east of the Study Area. The Mackinac Bridge is the only connection between the two peninsulas.

Traffic volumes were relatively stable until the mid 1960s. Since that time, there has been a significant increase in the amount of traffic using the region's highways. With the attraction that region has for fishermen, skiers, hunters, vacationers, snowmobilers and sightseers, the average daily traffic counts have increased by over 50 percent. The traffic peaks occur between June and September, particularly on the weekends.

#### Airports

Since early in the twentieth century, Michigan has played a prominent role in the progress of aviation. As early as 1915 mail-carrying flights were made between Saginaw and Flint. In 1929 Michigan officials recognized the need for state regulation of the aviation industry by establishing the Michigan Board of Aeronautics. In 1969, there were 5,333 registered aircraft in Michigan.

Michigan's 1970 airport system consisted of 294 licensed or approved airports, 6 seaplane bases, 2 heliports, 4 military fields, and some 467 personal use landing strips which are not licensed or approved.

While air traffic has significantly expanded in lower Michigan, the Upper Peninsula has not experienced this growth. The economic ties between the two Peninsulas are not as strong as the upper region's connections with Wisconsin and Minnesota. All commercial flights to Detroit



from the Upper Peninsula must route through Green Bay, Wisconsin. There is only limited commuter service to the Lower Peninsula. There has been a succession of commuter airlines that have tried to establish service in the Upper Peninsula but have failed because of insufficient demand.

#### Railroads

The railroad system in Michigan was developed to satisfy the demand for overland bulk commodity movement. This is especially true in the Upper Peninsula where the iron mining industry comprises the greatest portion of the market. Approximately 1,500 miles of Michigan's 6,600 miles of railroad route miles service the Upper Peninsula.

The Michigan Railroad Network is interstate and international, having over thirty carrier connections with rail trackage in other states and Canada. Michigan's geography is essentially two peninsulas which are outside the interstate mainline corridors, however, Michigan has more than three percent of the U. S. railroad route miles.

The Upper Peninsula's rail lines to Canada and Lower Michigan are limited. A railroad bridge at Sault Ste. Marie is the Canadian link while a carferry service at the Straits of Mackinac connects the Lower Peninsula. There are six connections from the Upper Peninsula with Wisconsin.

#### Harbors

The Upper Great Lakes Region has largely a natural resource-oriented economy which never developed beyond the primary industrial level. Because of this and its proximity to the Great Lakes, waterbound bulk commodity movement has played an important role in the area's history.

U. S. Great Lakes ports transport more than half of U. S. total waterborne commerce in the following bulk commodities: gypsum 99%, limestone 78% and iron ore 70%. The Upper Great Lakes ports account for the dominant shares of U. S. Great Lakes movements of the following bulk commodities: limestone 97%, forest products 85%, iron ore 82%, building cement 79% and grains 56%.

The predominant movements of bulk commodities in the Upper Great Lakes Region are domestic lake-wide shipments of iron ore which account for more than half of all bulk commodity movements. With the expansion of Tilden Mine, increased exports of iron ore have occurred at both Presque Isle and Marquette deepwater harbors.

## Anticipated Future Conditions

### Roads

A Transportation Systems Plan for the entire Upper Peninsula is being developed by the Department of State Highways and Transportation. Within the Study Area, several north-south and east-west highway alignments have been proposed. During 1976 the Department will be conducting many public meetings which will help determine which alternatives should be studied further. These alternatives and other proposed highway changes are listed in Appendix A.

### Airports

The Michigan State Airport Systems Plan approved by the Michigan Aeronautics Commission in 1974 recommended a 1990 system for general aviation that includes 162 airports of which 59 are new. Within the Study Area, the Plan's objective is to have 8 airports of which three would be new. By 1990, two new airports are scheduled to be constructed, and six existing ones improved within a zone that surrounds the Study Area but never extends an unreasonable distance from it.

The Plan's objectives included:

- o provisions for aviation capacity to accommodate forecast levels of general aviation activity in a given geographical area
- o provisions for a reasonable geographic distribution of airports throughout the State.

The improvements or construction of the general aviation airports in the next ten years include a minimum of one paved airway 2,700 feet in length. These facilities can service only small private or corporate planes. The commercial airport's runway lengths will range from 6,500 to 7,000 feet. The largest aircraft these facilities can accommodate is a 100 passenger jet.

The Michigan State Airport System Plan recommended that air carrier service continue at Iron Mountain, Escanaba and Menominee, but that all traffic from Iron Mountain and Escanaba be routed through Menominee, thus justifying frequent nonstop service from Menominee to Detroit and Chicago. This would be the first direct commercial passenger service to Lower Michigan. The present commercial service at the

other airports in the region is expected not to change. Most of the region will continue to rely on commuter airlines for flights to the Lower Peninsula.

The facilities at Marquette and Iron Mountain will be expanded by 1990. The runway lengths are projected to increase from 6,500 feet to 7,000 feet, but this will not change their classification. These facilities are expected to handle twice the number of air passenger that are now being accommodated.

Table 1. AIRPORT TRAFFIC STATISTICS

City	Airport	Airline Passengers			Airline Cargo (Excluding Mail)		
		1964	1970	1974	1964	1970*	1974
Iron Mountain	Ford	7,156	25,904	32,221	40,020	575,135	501,260
Marquette	Marquette County	10,765	49,050	59,967	26,700	367,529	567,158

\* Truck Strike during April and May

Source: Michigan Aeronautics Commission, Airline Records, 1964, 1970 and 1974

Carlson Airport in Baraga County is presently privately owned. The Plan's objective is for this airport to become publically owned and to be enlarged. The facilities at Iron River are to be closed when a new airport is sited and constructed in the next ten years. (See Appendix B for detailed description of future airport developments.)

#### Railroads

The expansion of mining activity in the Upper Peninsula has had a significant impact on the railroad lines operation in the region. According to the Michigan Railroad Plan, Phase II Report, every railroad line in the Upper Peninsula is solvent, and this is the only region that has no railroad lines affected by the Railroad Reorganization Act of 1973. The entire Upper Peninsula has only three pending abandonment cases. The only line within the Study Area petitioned for abandonment is the Chicago, Milwaukee,

St. Paul and Pacific Railroad's Republic-Champion Line. Just to the east of the Study Area, the Soo Line's Rapid River-Eban Junction line has been petitioned for abandonment. The railroad carferry service at Mackinac Straits, which is the only other abandonment petition in the Upper Peninsula, is owned by the Mackinac Transportation Company.

The Report mentions that the State's position on the abandonments in the Study Area is that "It does not appear practical or reasonable for the State to subsidize continuing operation of these lines. The State will therefore recommend closing these lines and acquiring the rights-of-way and placing same in a 'land bank'". The Michigan Railroad Plan says that the State has determined that because of increasing defaults and deteriorating service at the Straits the carferry service run by the Mackinac Transportation Company should be terminated.

The Plan's Report goes on to mention that the State of Michigan will ascertain the extent to which Wisconsin is willing to participate in preservation of carferry service at the Straits of Mackinac and on Lake Michigan. The State considers single ownership and operations of all carferry services to be the most efficient and cost effective objective. Route alteration to improve traffic flow will be analyzed. Michigan will consider the development of a bi-state authority with the State of Wisconsin to ensure continued efficient carferry service that meets the transportation requirements of industry and agriculture in both States.

#### Harbors

The potential of waterborne bulk commerce depends on the possible expanded need for bulk commodity transportation to and from Great Lakes, national and international markets. For Marquette and Presque Isle this has meant the transportation and handling of iron ore, coal and major petroleum products. Moderate increases in petroleum products imported through both ports is expected. The Marquette port is in the process of reconstructing its coal pier so that it can handle the increased coal imports for the new power plant that services the Tilden Mine and parts of Marquette County.

According to the Harbor Planning division of the Bureau of Transportation Planning, the increased demand for clean western coal by power plants around the Detroit area will



increase the bulk traffic for the Upper Great Lakes Region. Coal mined in Montana and Wyoming is being transported to Superior, Wisconsin and Marquette's deepwater harbor. From there the coal is transported to the Detroit area. Traffic from this export is expected to increase in the future.

The increased demand for iron ore which has resulted in the expansion of Tilden Mine is expected to significantly expand the amount of iron ore exported from the deepwater harbors in the Study Area. By 1980, 6 million tons of ore are expected to be shipped annually to the Lower Great Lakes region. The existing harbor facilities are large enough to handle the projected increases in bulk traffic.

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Table 2. HARBOR COMMODITY STATISTICS

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	Actual*		Projected*	
	1959	1970	1975	1980
<u>Marquette Harbor, Michigan</u>	<u>978</u>	<u>1,446</u>	<u>2,300</u>	<u>7,550</u>
Iron Ore	723	769	1,500	6,000
Coal	206	629	750	1,500
Major Petroleum Products	49	48	50	50
<u>Presque Isle Harbor, Michigan</u>	<u>2,792</u>	<u>3,879</u>	<u>4,070</u>	<u>4,000</u>
Iron Ore	2,792	3,816	4,000	4,000
Major Petroleum Products	-	63	70	70

\* Thousands of short tons

Source: Harbor Planning Division, Michigan Department of State Highways and Transportation

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### Bridges

All proposed bridge construction within the Study Area is scheduled for State Highway 35 between Gwinn and U. S. Highway 41. The expected date of construction is 1980. At that time the seasonal truck restrictions will probably be removed. See Table 1 in Appendix A for proposed bridge construction.



## DISTINCTIVE UNITS AND CHARACTERISTICS

### Roads

U. S. 2 is the major east-west highway across the southern edge of the area. It is a two-lane roadway connecting the area with Lower Michigan on the east, and extending westward through Wisconsin and Minnesota. The main east-west highway across the northern part of the Upper Peninsula is U. S. 41, from east of Marquette to central Baraga County, and State Highway 28, west from that point, connecting the City of Marquette with Munsing and Sault Ste. Marie to the east and Duluth and St. Paul to the west. The major north-south routes through the area are U. S. 141, M-95, and, near the eastern edge of the Study Area, U. S. 41. Totally, there are five U. S. routes, nine state routes, and no interstate highways in the Study Area.

In the Study Area the majority of the trunkline roads fall in the second lowest State Department of Transportation traffic flow category, 1,600-3,499 vehicles in a 24 hour period. M-35 and U. S. 141 are the only roads that have significant structures (bridges) that fall in the lowest category, 0 to 1,599. On roads closer to urban areas, there is an increase in traffic flow, most falling in 3,500-9,999 category, but U. S. 41 in Marquette and U. S. 2 near Iron Mountain have recorded 24 hour traffic flows of over 10,000 cars. The maximum traffic flow month is August and the minimum is December.

State Highway 35 running from the town of Palmer to the town of McFarland is the only section of road in the Study Area that is classified as a seasonal truck route with flexible pavement and load limitations (labeled Sf on the Transportation Data Map). Duration of load limits is decided by maintenance field forces. The limitation is enforced during the spring months. Flexible pavements are bituminous concrete, sheet asphalt or bituminous surfaces on a gravel or similar type base. Since 1973 State Highways 189, 73, 28 and a part of 35 have had seasonal limitations removed because of reconstruction on these stretches of highway.

While the remaining trunkline roads in the Study Area are categorized as all-season truck routes almost all of the State and U. S. Highways have a special designation. State Highways 95, 94, 69, 38 and 28 are classified as special designated highways as are U. S. Highways 141, 41, 8 and 2 (labeled PS on the data map). All truck and trailer combinations are affected by the designation which enforces

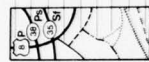
# TRANSPORTATION

**ROAD CLASSIFICATION**  
U.S. Numbered Highway  
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Designated County Road

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6 Mile Square

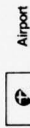
6 Mile Square



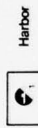
All Season Truck Route  
All Season Truck Route  
Seasonal Truck Route  
Other Paved Road  
Gravel Road  
Good Dirt Road  
Poor Dirt Road  
Railroad  
Abandoned Railroad

All Season Truck Route	All Season Truck Route (Special Designation)
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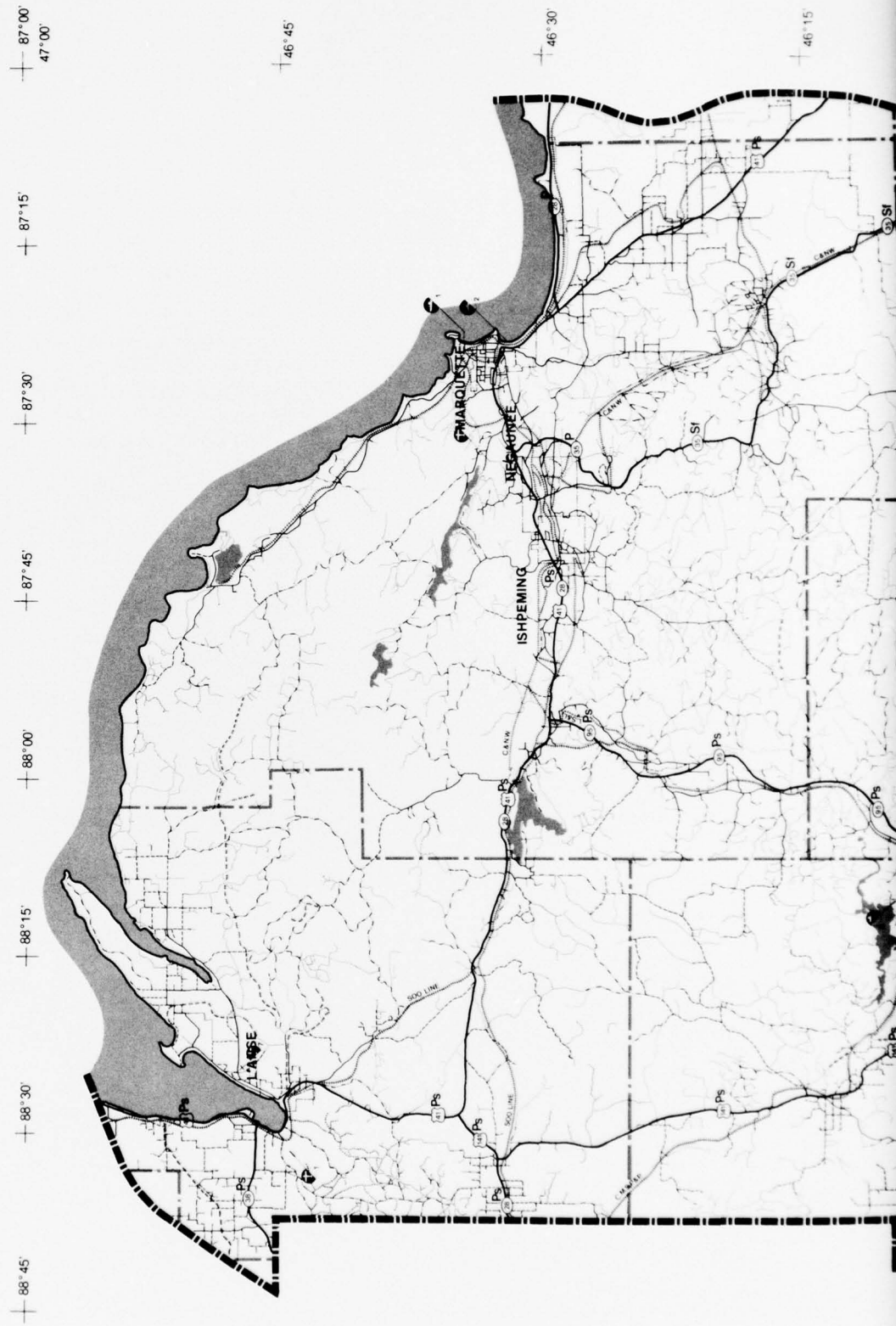
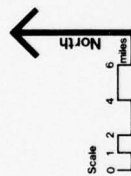
**ROAD CLASSIFICATION**  
U.S. Numbered Highway  
State Highway  
Designated County Road

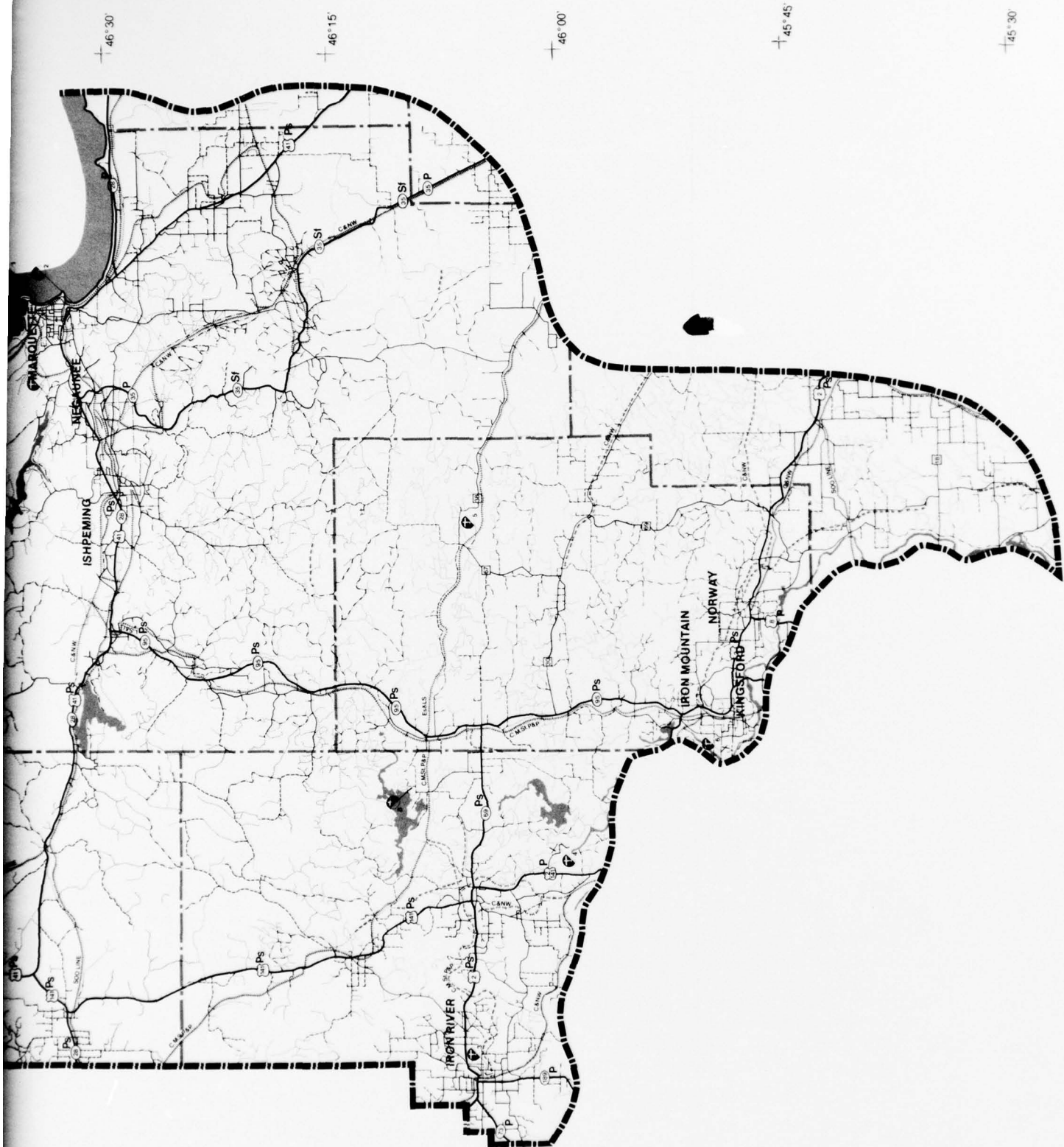


**Airport**



Harbor





2



weight and length limits. Refer to Appendix C for more details of restrictions on the trunkline highways in the Upper Peninsula.

Bus service within and between cities is limited. It is characterized by long distance trips between communities. Except for the Menominee-Ishpeming service, buses travel through the Study Area only during the evening and early morning hours. Fixed-route urban bus service exists in the City of Marquette and the Marquette-Negaunee-Ishpeming corridor. Fixed-route intercity bus service is provided by the Greyhound Company. The route connects Iron River, Crystal Falls, Iron Mountain, Marquette, Negaunee, Ishpeming, Baraga and L'Anse in the Study Area. Escanaba, Menominee, Draggett, Wallace, Bark River, Gladstone, Rapid River and Houghton, just outside the Study Area boundary, are also included. The route used includes U. S. Highways 2 and 41 within the Study Area. Only U. S. 41 east of the Study Area offers a direct north-south route. Trends in intercity public transportation have been characterized by a decrease in the number of passengers and a reduction in the number of bus miles operated. Intercity bus routing and ridership in the Upper Peninsula have remained relatively unchanged during the past five year period.

Marquette is the only City in the Study Area that offers local bus and Dial-A-Ride bus service in and around the community. Escanaba is the only other City near the Study Area to offer this same service. All the counties except Marquette in the Study Area have small vans or buses to serve the elderly and handicapped in the rural parts of the counties. The services provided are generally on a demand responsive or prearranged basis. Extreme flexibility exists in routing and scheduling.

The transportation map includes all hard surfaced roads, gravel roads, good dirt roads and poor dirt roads. In distinguishing between a good and poor dirt road, the following points were used: good dirt road is traveled at about 25 miles per hour or faster in the dry season and gets considerable public use; on a poor dirt road the average driving speed is less than 25 miles per hour and this class of road does not get much public use.

The amount of public use may be determined by the condition of the road surface. A dirt road which is used considerably by the public will show evidence of being traveled over the entire crown. A road which receives little public use will have just the two wheel tracks and on the better soils grass may be found growing in the center of the roads. As an example, the woods and the plains roads that are used seasonally by hunters, fishermen, berry pickers,

etc., and those roads in a farming community which receive little use. Occasionally, a dirt road will be found on which the average driving speed will be over 25 miles per hour but still the road will show evidence of little public use.

Outdoor recreation vehicle trails are designated by trail markers along a good portion of the dirt roads in the Study Area. Abandoned railroads and utility rights-of-way are sometimes also designated as groomed trails because very little clearing was needed to establish the outdoor recreation vehicle trails. Almost all the trails in the Study Area use existing cleared paths (i.e., gravel roads, good and poor dirt roads and abandoned rights-of-way).

### Airports

The Study Area has six airports that are open to the public and one Air Force Base. K. I. Sawyer Air Force Base, located 15 miles south of Marquette, is under the strategic air command and houses a fighter squadron and a bombing wing (see the Land Use Data Report for a detailed description). Five of the six airports are publically owned. Carlson Airport in Baraga, now privately owned, has been recommended for public ownership by the Michigan State Airport Plan. The Stambaugh City Airport, now named Iron River Airport, will close when a new facility is located and built.

Four of the six airports in the Study Area are paved. Of these, two have runways over 4,000 in length. Only two airports provide air carrier service while the rest are designated as basic utility carriers. They provide service for only small private or corporate planes.

Beside the above airports, Skanee City and Phelan's Resort Airports are within the Study Area. Neither was mentioned in the Michigan State Airport Plan and are not eligible for any future State or Federal construction funds. Since they do not appear on the aeronautical charts they are listed as abandoned. (See Table 3.)

Ford and Marquette are the only licenced commercial airports in the Study Area. Air carrier service is provided by North Central Airlines, and commuter service is provided by Air Metro which has taken over for the folded Great Lakes Commuter and Trans-Michigan Airline Companies. Many firms in the past have tried to provide service but have been unable to show a profit. Air Metro services Houghton, Marquette, Traverse City, Lansing and Detroit. North



Table 3. AIRPORTS WITHIN THE STUDY AREA

No.	Airport Name	County	No. Runways	Length Runway	Surface	Ownership	Lights	Radio Facilities	Remarks
<u>Existing Airports</u>									
1	Carlson	Baraga	1	2808x140	Turf	Private	No	None	Closed Dec. 1 - May 1, Fuel 80, basic utility
2	Marquette	Marquette	2	6500x100 3000x75	Bituminous	Public	Yes	Vortac, DF	Fuel 80, 100, kerosine, published approach, U.S. Custom landing rights air carrier service
3	Iron River	Iron	1	2164x50	Bituminous	Public	Yes	None	Fuel 8, 100 basic utility
4	Iron County	Iron	2	3700x50 2500x150	Bituminous Turf	Public	Yes	None	Fuel--none utility
5	Ralph	Dickinson	1	2000x300	Turf	Public	None	None	Closed winter months fuel--none, basic utility
6	Ford	Dickinson	2	6500x100 6500x100	Bituminous	Public	Yes	Unicom, Vortac	Fuel 80, 100 Published approach air carrier service
<u>Abandoned Airports</u>									
7	Skaneateles	Baraga	2	2450x70 2215x75	Turf	Private	None	None	Fuel--none
8	Phelan's Resort	Iron	1	1770x150	Turf	Private	None	None	Fuel-80

\* K. I. Sawyer Air Force, see Land Use Report for detailed information

Central provides regular jet service to Marquette and Con-vair 580 service to Ford. Both airports have facilities to accommodate DC-9 and 727 jets. They are classified as B-3 Air Carriers.

The numbers next to airport symbols on the Transportation Data Map correspond to numbers in Table 3.

### Railroads

Six railroad companies service the Study Area. Four are listed as Class I railroads indicating they have gross operating revenues of \$5 million or more. They are as follows:

#### Class I

Chicago and Northwestern (C&NW)  
Chicago, Milwaukee, St. Paul & Pacific (CMSP&P)  
Lake Superior & Ishpeming (LS&I)  
Soo Line

#### Class II

Escanaba & Lake Superior (E&LS)  
Marquette & Huron Mountain (M&HM)

The Soo Line is the major east-west line connecting the Study Area to Sault Ste. Marie to the east and Duluth to the west. The CMSP&P operates a north-south line parallel to Route 95 which extends from the iron mining district around Ishpeming to Iron River and Iron Mountain. They operate a second line between Kelso Junction and Ontonagon on Lake Superior. The C&NW RR has a line running roughly parallel to the Michigan-Wisconsin border, with feeder lines connecting from the south, a line extending from the Ishpeming mining district to Escanaba, and a number of smaller lines. LS&I and E&LS Railroads own and operate several lines in the eastern section of the Study Area. The M&HM Railroad has one line running along the Lake Superior Coast in Marquette County from Big Bay to Marquette.

Railroad transportation in the area is solely of freight; all intercity passenger service has been terminated. Most of the routes are oriented toward the area's mineral resources--iron in Gogebic, Marquette and Iron Counties, and copper along the Keweenaw Range and to a lesser extent lumber and pulp. There is no rail service utilizing the Mackinac Bridge to connect the Upper and Lower Peninsulas of Michigan.

The Transportation Map identifies both existing and abandoned railroad rights-of-way.

### Harbors

Marquette and Presque Isle are the only ports located in the Study Area. Both are federal ports located on Lake Superior on the northeast border of the area. According to the U. S. Army Corps of Engineers, both harbors are classified as deep draft harbors. The controlling depth of Marquette is 27' and Presque Isle 30' in approach, 28' in basin.

### Bridges

There are four bridges on the State trunklines in the Study Area that have special load limits. Two other structures have overhead clearances of less than fourteen feet. Tables 2 and 3 in Appendix C list the structures and their locations. The structures that have critical deficiencies are described in Table 1 of Appendix D. Table 2 notes all the bridges within the five counties that have a majority of their area within the Study Area boundary. The Table lists the load capacity and vertical clearances of the structures.

#### RELATIONSHIP TO OTHER DATA

There exists an obvious relationship between the Study Area's circulation system and the existing utility distribution systems. Telephone lines, with few exceptions, and electrical single phase, three phase and transmission lines follow the general channels formed by highway rights-of-way.

The market value of an area is related to and partially determined by the efficiency and variety of access to it. Roads and railroads, unlike airports, provide only limited directional transportation due to Lakes Superior and Huron.

During the winter months when the ports of Marquette and Presque Isle are closed by ice, the majority of the bulk commodities entering and leaving these ports by land are transported by rail. Since railroads in the area transport bulk commodities rather than passengers, their location is closely linked to industrial sites (especially mineral extraction points) and harbors rather than populations centers. Railroad lines tend to parallel major highway arteries.

Airports, like roads, tend to be located near population centers. Commercial air transportation depends on a sufficient road system to provide it with the necessary passengers and cargo to permit profitable operation. The long winter season and high snowfall are also prime considerations in the design and operation of the area's airports.



## VALIDITY

The locations of all roads were ascertained from the individual county maps drawn by the Department of Natural Resources. These maps were updated in 1974. From these maps it was determined whether a road was paved, gravel or unsurfaced. The maps were updated by the Department of Natural Resources and county personnel by interpretation of aerial photographs and field checking the condition of the roads. They can be considered highly reliable. All traffic flow data were obtained from the State's average 24 hour traffic flow map. Since only general information was drawn from this source it should be considered sufficiently up to date and accurate.

All of Appendix A and the information used to classify truck routes as seasonal, all season, or all season special designation was taken from the official 1975 Michigan Truck Operators' Map. This information was published in 1975 and is highly credible. All changes to the seasonal limitations not shown on the 1975 map were obtained by an interview between EDAW personnel and Michigan Department of Highways staff.

In Appendix B, the information concerning the type and location of proposed construction of highways and bridges was obtained from Michigan Department of State Highways and Transportation Report Number 68, Letting Schedule, December 1, 1975. The information should be considered up to date and accurate. The Michigan Department of State Highways and Transportation Map of alternate corridors is only conceptual and should not be considered final.

The existing railroad lines and abandoned rights-of-way were copied from the same Department of Natural Resources Map from which the road locations were obtained. These lines were checked against the 1975 Official Railroad Map of the State of Michigan. All pending abandonments were obtained from the Michigan Railroad Plan, Phase II.

Airport runway locations were taken from the county general highway maps. Locations were confirmed by the January 1, 1973 Michigan's Aeronautics Commission's Airport Directory. The data in Table 3 also came from the Airport Directory and the Michigan State Airport Systems Plan through 1990. The information for Appendix B on future development came also from the previous mentioned report.



Current airline services information was obtained by an interview between EDAW personnel and staff members of the Bureau of Transportation Planning. Skanee Airport and Phelan's Resort are no longer open to the public but some private planes may still be using the facilities. Some obstruction such as tall trees are within the landing approach zone. These airports have been removed from the Michigan Airport Directory for this reason.

All information pertaining to harbors was compiled from the Origin-Destination Study of Bulk Commodity Movement, Upper Great Lakes Region, and an interview with the manager of the Port Development Section of the Bureau of Transportation Planning. This information can be considered accurate and reliable.

All the bridge locations and statistics in Appendix D were obtained from Michigan Department of State Highways and Transportation, Report Number 44, State Highway Bridges and Grade Separations. It was written in 1974 and can be considered current and reliable.

The information on the sufficiency ratings for highways and bridges in the Upper Peninsula was obtained from Reports Numbers 153 and 226 by the Michigan Department of State Highways and Transportation. The information was compiled in 1974 and is the most recent data for the region. Also included is the 1974 State Trunkline Highway Plan and map of the deficient roads in the Study Area which the Michigan Department of State Highways and Transportation derived from the sufficiency reports.

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APPENDIX A

STATE HIGHWAY CONSTRUCTION PROGRAM

Source: Michigan Department of State  
Highways and Transportation.  
Report Number 68, Letting  
Schedule. December 1, 1975

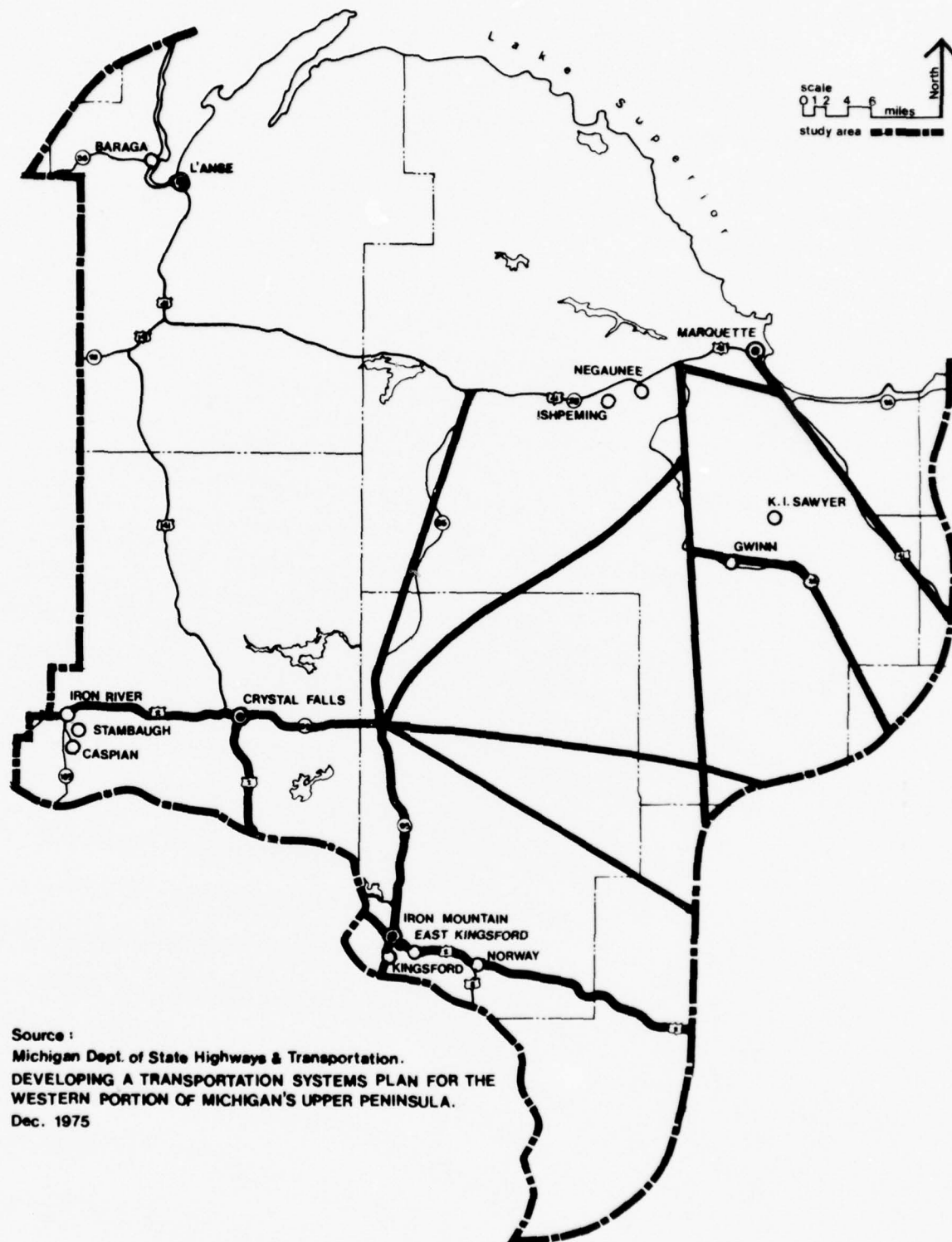
**Table 1. FUTURE STATE HIGHWAY CONSTRUCTION  
IN THE STUDY AREA**

<u>County</u>	<u>Route</u>	<u>Location Description</u>	<u>Mi.</u>	<u>Type of Work</u>	<u>Let Date</u>
Baraga	M38	West County Line-West City Line Baraga	9.6	Reconstruct	8/80
Dickenson	Pyle Dr.	Westwood-Woodward, Kingsford	9.5	Construction Roadway	6/76
	U.S. 2	U.S. 141-U.S. 8	5.6	Improve and Resurface	5/83
	U.S. 2	U.S. 8-East County Line	11.1	Improve and Resurface	5/83
Iron	U.S. 2	Beechwood-Gibbs City Road	5.9	Reconstruct	2/77
	U.S. 2	Gibbs City Road - 9th Street	2.3	Widening, Clearing, and Grubbing	8/77
	U.S. 2	Iron River-M69, Crystal Falls	15.7	Improve and Resurface	5/79
	U.S. 2 & 141	State Line-M69, Crystal Falls	10.0	Widening and Resurface	5/79
Marquette	County Roads	U.S. 41 Soo Line Railroad in Marquette	2.8	Widening and Resurface	2/76
	County 553	Crossing at Central and N.W. Railroad, Sawyer Air Force Base	0.0	Railroad Structure*	7/76
	M35	Little Lake-County Road 553	2.8	Reconstruct and Realign	2/79
	M35	County Road 553-Lobb Street, Gwin	3.7	Reconstruct and Realign	2/79
	M35	Between Palmer & Gwinn o Middle Bridge o Green River o Fifteen Creek o Sweitzer's Creek o Warner Creek (1) o Warner Creek (2)	0.0	Structure* Realign	2/80
	M28 BR	West County Line-East County Line Ishpeming	3.1	Reconstruct	11/80
	M28 BR	West County Line-Negaunee, Nely-M28	2.1	Reconstruct	11/80
Menominee	U.S. 2	West County Line-U.S. 41 in Powers	10.2	Improve and Resurface	5/82

\* Bridge

Table 2. U.S. 2 RECONSTRUCTION UNDER ACT #327

<u>Location Description</u>	<u>Miles</u>	<u>Let Year</u>
State Line to South Brook of the Black River	11.9	1985
South Brook of the Black River to M28	0.6	1981
M28 to Bedell Street	0.8	1981
Bedell Street to East Junction of M64	14.8	1985
East Junction of M64 to Gogebic Station	8.2	1985
Gogebic Station to West of U.S. 45	16.2	1985
West of U.S. 45 to U.S. 45	1.4	1975
U.S. 45 to East County Line	9.0	1975
West County Line to Beechwood	18.6	1975
Beechwood to Gibbs City Road	5.9	1977
Gibbs City Road to 9th Street	2.3	1977
Iron River to Crystal Falls	15.7	1979
Crystal Falls to State Line	10.0	1979
State Line to U.S. 141	7.0	1983
U.S. 141 to U.S. 8	5.6	1983
U.S. 8 to East County Line	11.1	1983
West County Line to U.S. 41 in Powers	10.2	1982
U.S. 41 in Powers to East County Line	9.6	1982
West County Line to West County Line Escanaba	11.4	1982
Escanaba to M35	1.0	1978
U.S. 41 (Rapid River) to East County Line	25.5	1981
West County Line to M149	7.6	1981
M149 to West County Manistique	6.0	1980
West County Line Manistique to Range Street	1.8	1978
Range Street to M77	21.3	1980
M77 to East County Line	3.0	1979
West County Line to M117	14.1	1979
M117 to Hiawatha Trail	21.3	1979
Hiawatha Trail to St. Ignace	26.9	1979



Source :  
Michigan Dept. of State Highways & Transportation.  
DEVELOPING A TRANSPORTATION SYSTEMS PLAN FOR THE  
WESTERN PORTION OF MICHIGAN'S UPPER PENINSULA.  
Dec. 1975

## ALTERNATIVE FUTURE HIGHWAY CORRIDORS WITHIN THE STUDY AREA





## UPPER PENINSULA CONSTRUCTION PROGRAM

SOURCE: MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

Figure 2  
26

APPENDIX B  
RECOMMENDED DEVELOPMENT OF  
EXISTING AIRPORTS  
AND  
PROPOSED NEW AIRPORTS

Source: The Michigan State Airport  
System Plan, through 1990.  
Michigan Aeronautics Commission.  
August, 1974.

Table 1. AIRPORT OPERATIONAL ROLES

Classification of Airports Serving Air Carriers

<u>Code for Operational Role*</u>	<u>Length of Longest Flight</u>	<u>Typical Length of Longest Runway</u> (Uncorrected, in feet)**	<u>Examples of Largest Aircraft Accommodated</u>
A1	Over 1,500 miles	11,500'	Large Jet Aircraft
A2	500 to 1,500 miles	9,500'	(i.e., B-747, B-707
A3	Less than 500 miles	8,000'	and DC-8)
B2	500 to 1,500 miles	8,000'	100-Passenger Jet
B3	Less than 500 miles	6,000'	(i.e., DC-9, B-727)
C3	Less than 500 miles	5,000'	50-Passenger Turbo-prop (i.e., CV-580)
C5	Less than 500 miles	5,000' (corrected)	Small Aircraft (i.e., 15-Passenger)

Classification of Airports Serving General Aviation

<u>Code for Operational Role</u>	<u>Examples of Largest Aircraft Accommodated</u>	<u>Level of Activity</u>	<u>Percentage of GA. Fleet Accommodated</u>	<u>Typical Length of Longest Runway</u>
BI-(Basic Utility) Stage I	Cessna-172 Piper Tri-pacer, etc.	Less than 10 aircraft based at airport	75%	2,700'
BII-(Basic Utility) Stage II	Cessna-310 Beech Baron, etc.	More than 10 based aircraft. Less than 20,000 operations per year	95%	3,200'
GU-(General Utility)	Beech King & Queen Airs, Piper Navajo, etc.	More than 20,000 operations per year of 500 oper- ations per year by general utility type aircraft	98%	3,800'
BT-(Basic Transport)	Lear Jet, Sabreliner Cessna Citation, etc.	500 or more opera- tions per year by business jet air- craft	99+%	5,000'
GT-(General Transport)	Convair 580, Boeing 727, DC-9, etc.	Substantial opera- tions by very large general aviation air- craft (over 60,000 pounds gross weight)	100%	5,000'+

\* Includes those roles applicable only to Michigan.

\*\* Selected values are based primarily on Michigan experience; namely,  
corrected lengths of 6,500 feet for B3 role and 5,500 feet for C3 role.

Table 2. RECOMMENDED DEVELOPMENT OF EXISTING AIRPORTS  
WITHIN THE STUDY AREA

Map No.	Airport Name	City & County	Operational Role Existing	Operational Role Proposed	Runway Length Existing	Runway Length Proposed	Construction Period	Recommended Development
1	Carlson	Baraga, Baraga	-	B-I	2080*	3200* 3200	72-92	Become a Publically-owned facility, new runway later extended, stub taxiway, apron, parking, administration building, extend runways to 3,200, runway and taxiway lighting approach aids: REIL and VASI, markings and obstruction removal
2	Marquette County	Marquette, Marquette	B3	B3	6500 3000	6900 3800	72-92	Runway extension, runway and taxiway lighting approach aids: VASI and REIL, control tower, new terminal, markings, expand parking
3	Iron River	Iron River, Iron						New airport to serve western Iron County. Site selection might show that existing airport is adequate for expansion
4	Iron County	Crystal Falls, Iron	B-II	G.U.	3700 2500*	3700 3200	72-82	Strengthen and widen runway, runway and taxiway lighting, approach aids: REIL and VASI, obstruction removal, markings
5	Ralph	Ralph, Dickinson	B-I	B-I	2000* -	2000* 2700	72-82	New runway, taxiway, apron, administration building, fencing, parking, markings, obstruction removal
6	Ford	Iron, Mountain Dickinson	B3	B3	6500 3800	7000 3800	72-92	Extend runway, parallel taxiways, expand apron, runway and taxiway lighting, approach aids: VASI and REIL, new terminal, Fire one crash building, markings, obstruction removal, expand parking, upgrade approach aids to "secondary"

\* Turf



Table 3. RECOMMENDED DEVELOPMENT OF EXISTING AIRPORTS  
NEAR THE STUDY AREA

Airport Name	City & County	Operational Role		Runway Length		Construction Period	Recommended Development
		Existing	Proposed	Existing	Proposed		
Delta County	Escanaba, Delta	B3	B3	6500 3800	6500 5600	72-92	Widen and extend runways, parallel taxiways, runway and taxiway lighting, up- grade approach aids to "secondary", expand terminal and parking, new Fire/crash building, obstruction removal
Houghton County Memorial	Hancock, Houghton	C3	B3	6500 5200	6800 5200	72-92	Extend runway, parallel taxi- ways, expand terminal up- grade approach aid to "sec- ondary" markings, runway and taxiway lighting, expand park- ing, obstruction removal
Menominee County	Menominee, Menominee	B.T.	B3	- 5100 3200	6600 5700 3200	72-92	Construct new runway, extend runways, parallel taxiways, runway and taxiway lighting, upgrade approach aid to "secondary", expand terminal, Fire/crash building, markings, expand parking, obstruction removal
Ontonagon County	Ontonagon, Ontonagon	B-II	B.T.	3500 -	5000 3200	72-92	New runway, extend existing runway, runway lights, ap- proach aids: VASI and REIL, administrative building, ob- struction removal, markings, parking, precision landing system
Hanley Field	Munising, Alger	-	G.U.	3500* -	3200 3800	72-92	New runway, extend and pave existing runway, parallel taxiways, taxi streets, apron, administration building, lighted wind cone, runway and taxiway lighting, beacon, approach aids: VASI and REIL, parking, markings, obstruc- tion removal
Bonnie Field	Rock, Delta	-	B-I	2725 -	2725 2700	77-82	New runway, taxiway apron, administration building, parking, markings, obstruc- tion removal

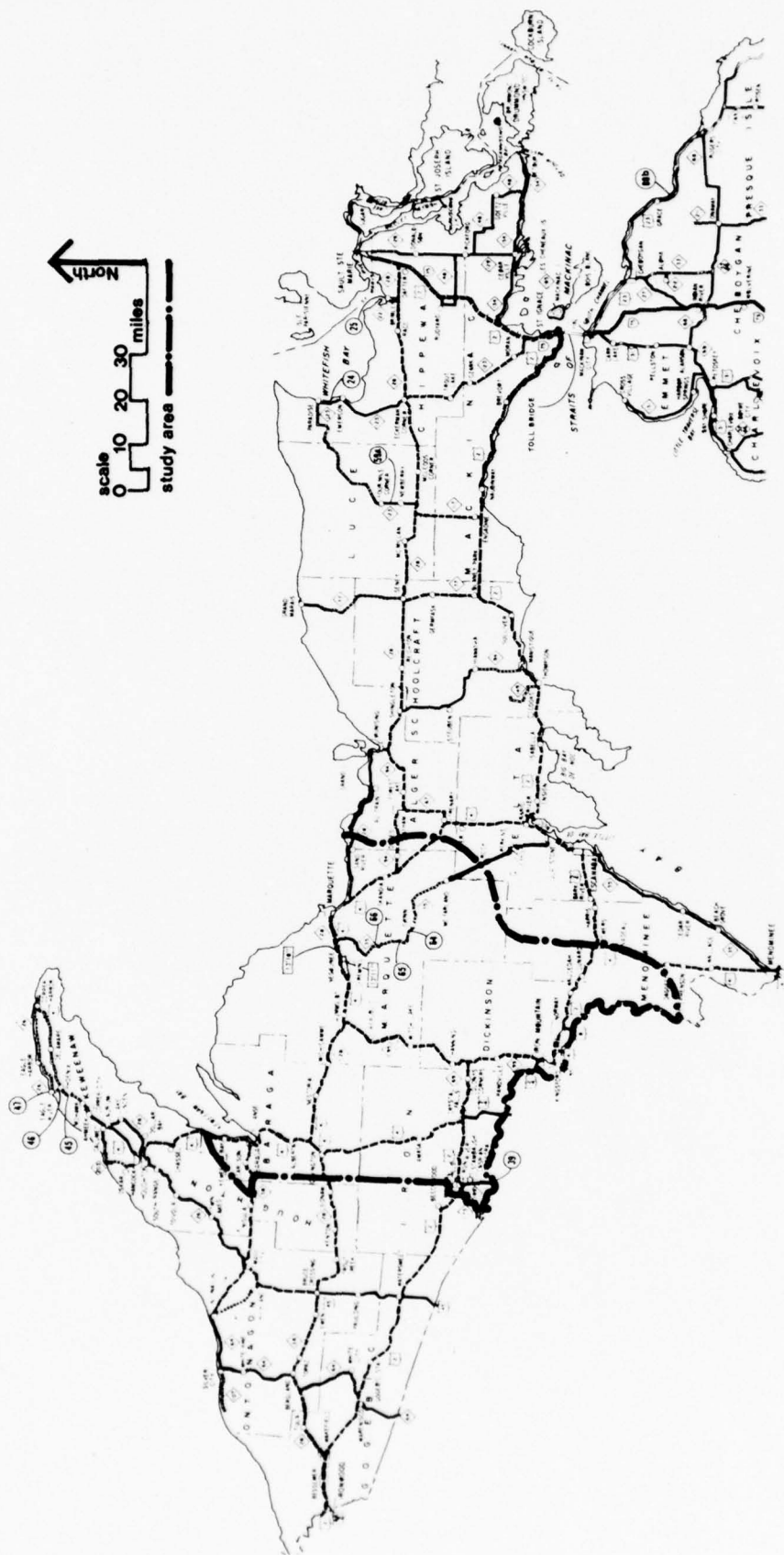
\* Turf

Table 4. PROPOSED NEW AIRPORTS

<u>City</u>	<u>County</u>	<u>Operational Role</u>	<u>Runway Length</u>	<u>Surface</u>	<u>Lights</u>	<u>Radio Facilities</u>	<u>Construction Period</u>	<u>Remarks</u>
<u>Within the Study Area</u>								
Hermansville	Menominee	B-I	2700	Paved	None	None	77-82	Taxiway, apron wind cone markings
Iron River	Iron	B-II	3200 2700	Paved Turf	Yes	REIL & VASI	77-82	Taxiway, apron, light wind cone, beacon markings to replace airport
Michigamme	Marquette	B-I	2700	Paved	None	None	77-82	Taxiway, apron, wind cone markings
<u>Outside the Study Area</u>								
Bruce's Crossing/ Ewen	Ontonagon	B-I	2700	Paved	None	None	72-77	Taxiway, apron, wind cone markings
Marenisco	Gogebic	B-I	2700	Paved	None	None	77-82	Taxiway, apron, wind cone markings

APPENDIX C  
SPECIAL DESIGNATED HIGHWAYS  
AND  
VEHICLE SIZE, WEIGHT AND LOAD RESTRICTIONS

Source: Michigan Department of State  
Highways and Transportation.  
Truck Operators' Map: 1975



# UPPER PENINSULA STATE TRUNKLINE ROAD WITH SEASONAL RESTRICTIONS

LEGEND			
<b>ALL SEASON ROUTES</b> No seasonal load limitations OPEN TO LEGAL AXLE LOADS FOR YEAR AROUND SERVICE	<b>SEASONAL ROUTES</b> Spring load limitations RIGID PAVEMENTS FLEXIBLE PAVEMENTS	<b>BRIDGES WITH SPECIAL WEIGHT LIMITS</b> 13-17 OVERHEAD CLEARANCES See Highway Form No. 2271 for other allowable truck loadings and dimensions.	<b>EXPLANATION OF ROAD TYPES</b> <b>RIGID PAVEMENTS</b> Concrete, Bituminous Concrete, Brick or other Surfaces on a Concrete Base <b>FLEXIBLE PAVEMENTS</b> Bituminous Concrete, Sheet Asphalt or other Bituminous Surfaces on a Gravel or Similar Type Base

Figure 1  
33



#### SPECIAL DESIGNATED HIGHWAYS

Truck-tractor, semi and trailer or truck and semi-trailer or trailer including load or motor vehicles wholly or partially assembled transported by utilizing 1 tow bar or 3 saddle mounts with full mount mechanisms and using the motive power of 1 vehicle; not to exceed a total length of 65 feet.

Truck-tractor and trailer or semi-trailer, designed and used exclusively to transport assembled motor vehicles or bodies or boats: Limited to a total length of 60 feet. The load on any such combination may extend an additional 3 feet beyond the front or rear thereof. Any combination exceeding 60 feet in length may be operated only on designated highways.

Truck-tractor, semi-trailer and trailer or truck and semi-trailer designed and used exclusively to transport assembled motor vehicles or bodies or boats: limited to 65 feet in length. The load on any such combination of vehicles may extend an additional 3 feet beyond the front thereof. Any combination exceeding 60 feet in length may be operated on designated highways only.

An additional 5 miles (on State Highways only) is allowed from any such designated highway, except those within the city limits of Detroit as identified on the Detroit insert, for access to or from points of origin or destination.

The total gross weight of any such vehicle or combination of vehicles shall not exceed a ratio of 400 pounds per engine net horsepower delivered to the clutch or its equivalent under conditions specified in the SAE test code.

Table 1.  
ALLOWABLE TRUCK LOADINGS AND DIMENSIONS

Destroy previous editions

T-1 (1/75)

REGULATIONS PERTAINING TO THE OPERATION OF TRUCKS AND TRAILERS ACCORDING TO ACT 300, P.A. 1949 AS AMENDED.

MAXIMUM OVERALL DIMENSIONS

Width	96 inches
Height	13 feet, 6 inches
Length of semi-trailer or trailer	No Restriction
Length of any other vehicle with or without load . . . (excluding impact absorbing bumpers)	40 feet
Units permitted in train	Truck, or tractor with semi-trailer, and 1 trailer
Length of any combination with or without load	55 feet
Projection beyond front of vehicles	3 feet
Overhang beyond rear of vehicles	Any amount is permissible if the legal overall length is not exceeded. But if this overhang is 4 feet or more, there shall be displayed on the extreme rear of such load a 12 inch red square flag in the daytime and a red light or lantern at night.
Axle Limitation	A combination of vehicles shall not have in excess of 11 axles.

EXCEPTIONS:

**WIDTH:** Unprocessed Logs, Pulpwood, Wood Bolts and Concrete Pipe, 104 inches for load only; Busses, 102 inches within incorporated cities or municipalities; Farm Equipment, if self propelled or towed along the highway, 186 inches between the hours of sunrise and sundown and 108 inches between the hours of sundown and sunrise, providing it does not extend across the center line of the highway.

**LENGTH:** Truck-Tractor, Semitrailer and Trailer or Truck and Semitrailer or Trailer: Any such combination of vehicles may exceed a total length of 55 feet, but shall not exceed a total length of 65 feet including load. Any such combination, except as herein described with regard to assembled motor vehicles or bodies or boats, may be operated only on such highways and routes as designated by the appropriate authorities.

**Truck-Tractor and Trailer or Semitrailer, designed and used exclusively to transport assembled motor vehicles or bodies or boats:** Any such combination of vehicles not to exceed a total length of 60 feet. The load on any such combination of vehicles may extend an additional 3 feet beyond the front and 4 feet beyond the rear thereof; total length of vehicles and load not to exceed 67 feet. Any combination exceeding 60 feet in length may be operated only on such highways and routes as designated by the appropriate authorities.

**Truck-Tractor, Semitrailer and Trailer or Truck and Semitrailer or Trailer, designed and used exclusively to transport assembled motor vehicles or bodies or boats:** Any such combination of vehicles not to exceed a total length of 65 feet. The load on any such combination of vehicles may extend an additional 3 feet beyond the front and 4 feet beyond the rear thereof; total length of vehicles and load not to exceed 72 feet. Any combination exceeding 60 feet in length may be operated only on such highways and routes as designated by the appropriate authorities.

**Motor vehicles wholly or partially assembled transported by utilizing 1 tow bar or 3 saddle mounts with full mount mechanisms and using the motive power of 1 vehicle:** Any such combination of vehicles may not exceed the maximum length of 65 feet. Any combination exceeding 55 feet in length may be operated only on such highways and routes as designated by appropriate authorities.

The total gross weight of any 65 foot combination of vehicles shall not exceed a ratio of 400 lbs. per engine net horsepower delivered to clutch or its' equivalent specified in the SAE test code.

**MOBILE HOMES:** 45 feet in body length, 60 feet when in combination with a towing unit 8 feet, 4 inches in width, 12 feet, 6 inches in height.

TABLE OF MAXIMUM ALLOWABLE GROSS AXLE LOADINGS

Spacings Between Axles	Normal Loading When Limitations Are Not in Force (Speed Limit 50 MPH) (Freeway 60 MPH) †	Seasonal Load Limitations (Speed Limit 35 MPH)	
		Rigid	Flexible
9 feet or over	18,000 lbs.	13,500 lbs.	11,700 lbs.
More than 3½ feet but less than 9 feet	13,000 lbs.	9,750 lbs.	8,450 lbs.
When part of a tandem axle assembly	* 16,000 lbs.	** 12,000 lbs.	*** 10,400 lbs.
When less than 3½ feet the combined weight shall not exceed	18,000 lbs.	13,500 lbs.	11,700 lbs.
Maximum load on any wheel shall not exceed: (pounds per inch of tire width)	700 lbs.	525 lbs.	450 lbs.

† 'Freeway' defined: A divided arterial highway for through traffic with full control of access and with all crossroads separated in grade from pavements for through traffic.

\* On any legal combination of vehicles, only one (1) tandem axle assembly shall be permitted at the gross weight of 16,000 lbs. per axle and no other tandem axle assembly in such combination of vehicles shall exceed a gross weight of 13,000 lbs. per axle. When the gross weight of a combination of vehicles with load, does not exceed 73,280 lbs., two (2) tandem axle assemblies shall be permitted at a gross weight of 16,000 lbs. per axle.

\*\* On any legal combination of vehicles, only one (1) tandem axle assembly shall be permitted at the gross weight of 12,000 lbs. per axle and no other tandem axle assembly in such combination of vehicles shall exceed a gross weight of 9,750 lbs. per axle. When the gross weight of a combination of vehicles with load does not exceed 73,280 lbs., two (2) tandem axle assemblies shall be permitted at a gross weight of 12,000 lbs. per axle.

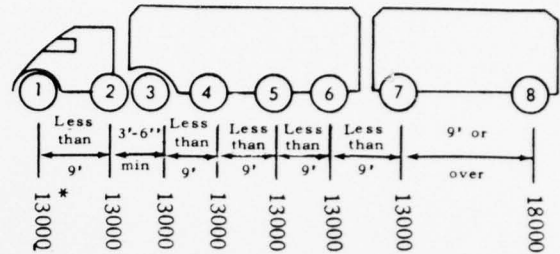
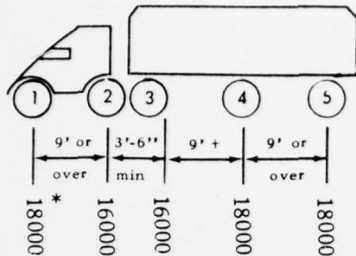
\*\*\* On any legal combination of vehicles, only one (1) tandem axle assembly shall be permitted at the gross weight of 10,400 lbs. per axle and no other tandem axle assembly in such combination of vehicles shall exceed a gross weight of 8,450 lbs. per axle. When the gross weight of a combination of vehicles with load does not exceed 73,280 lbs., two (2) tandem axle assemblies shall be permitted at a gross weight of 10,400 lbs. per axle.

Table 1. (Cont'd.)

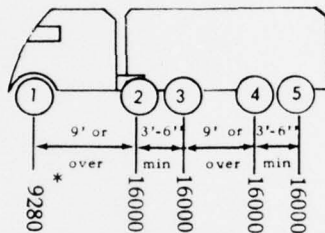
The following examples are shown as a guide for figuring the maximum allowable gross axle loads on all State Trunklines during all periods of the year.

- \* MINIMUM TIRE REQUIREMENTS: The maximum load on any wheel shall not exceed 700 pounds per inch of tire width.

Illustrations of axle spacings:



#### Public Act #36, 1965



"When the maximum gross weight of a combination of vehicles with load does not exceed 73,280 pounds, 2 tandem axle assemblies shall be permitted at a gross permissible weight of 16,000 pounds for any such individual axle."

#### Other Tandem axles and Multi-axes

On any other combination of vehicles exceeding a gross weight of 73,280 lbs., only one (1) tandem axle assembly shall be permitted at this weight (16,000 pounds per axle). No other tandem axle assembly shall exceed 13,000 pounds per axle.

**NOTE:** When restricted loadings are in effect, the normal maximum axle weights allowable on rigid pavements shall be reduced 25%, and the maximum wheel load shall not exceed 525 pounds per inch width of tire.

When restricted loadings are in effect, the normal maximum axle weights allowable on flexible pavements shall be reduced 35%, and the maximum wheel load shall not exceed 450 pounds per inch width of tire.

#### SPECIAL PERMIT INFORMATION

Vehicles or the loads thereon which exceed the legal dimensions or weights as listed, require a Special Transportation Permit for travel. Special Transportation Permits are issued only for the occasional movement of oversize or overweight vehicles or loads which cannot be dismantled, reduced or otherwise rearranged to come within the legal limits. Application for Permits to be made on regular Department Application Form No. 2258 or by making application via Teletype, Telex or Western Union. No Overweight Permits are issued when weight restrictions are in effect.

**NOTE:** Vehicles exceeding legal size or weight when using the Mackinac Bridge, must contact the Bridge Authority in advance. Any load in excess of 72 tons requires certification of the Bridge Authority approval before a permit will be issued.

#### MAXIMUM TRUCK SPEED

No truck, tractor or tractor with trailer, or any combination of such vehicles with a gross weight, loaded or unloaded, in excess of 5,000 pounds, shall exceed a speed of 50 miles per hour on highways or streets or 60 miles per hour on freeways. Speed shall be reduced to 35 miles per hour where reduced loadings are being enforced during the period of seasonal weight restrictions.

Table 2. BRIDGES IN THE STUDY AREA WITH SPECIAL LOAD LIMITS

Map No.	Bridge No.	Truck Line No.	Location	Tons On		Number of Lanes As Indicated*	Gross Weight (in Tons)		
				9' or more Apart	Any Level Less Than 9' Apart		1** Unit	2*** Units	3**** Units
39	B01-36031	M-189	8.3 miles South of Iron River	-	-	one truck on bridge at a time	-	-	-
64	B03-52032	M-35	4.4 miles Northwest of Princeton	-	-	one lane	33	42	51
65	B04-52032	M-35	5.8 miles Northwest of Princeton	8	6		33	42	51
66	B05-52032	M-35	6.0 miles South of Palmer	-	-		33	42	51

\* Maximum number or position of trucks allowed on bridge at any time as indicated

\*\* Single truck or bus

\*\*\* Truck and trailer or tractor and semi-trailer

\*\*\*\* Tractor, semi-trailer and trailer



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Table 3. STRUCTURES IN THE STUDY AREA  
WITH OVERHEAD CLEARANCES  
LESS THAN 14'-0"

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<u>Truck Line Number</u>	<u>Location</u>	<u>Overhead Clearance</u>
M-28 BR	Soo Line Railroad and Chicago & North- western Railroad in Negaunee (Silver Street)	13'-11"
U.S.-41 &	Lake Superior and Ishpeming Railroad 9.2 miles east of M-28 BR	13'-10"

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APPENDIX D  
SUFFICIENCY RATINGS OF THE TRUNKLINE HIGHWAYS  
AND THE STRUCTURES WITHIN THE STUDY AREA

SOURCE: MICHIGAN DEPARTMENT OF  
STATE HIGHWAYS AND TRANSPORTATION.  
THE SUFFICIENCY RATING FOR MICHIGAN  
HIGHWAYS AND THE SUFFICIENCY RATING  
OF BRIDGES OF THE MICHIGAN TRUNKLINE  
SYSTEM. 1974

### Deficient Trunkline Roads

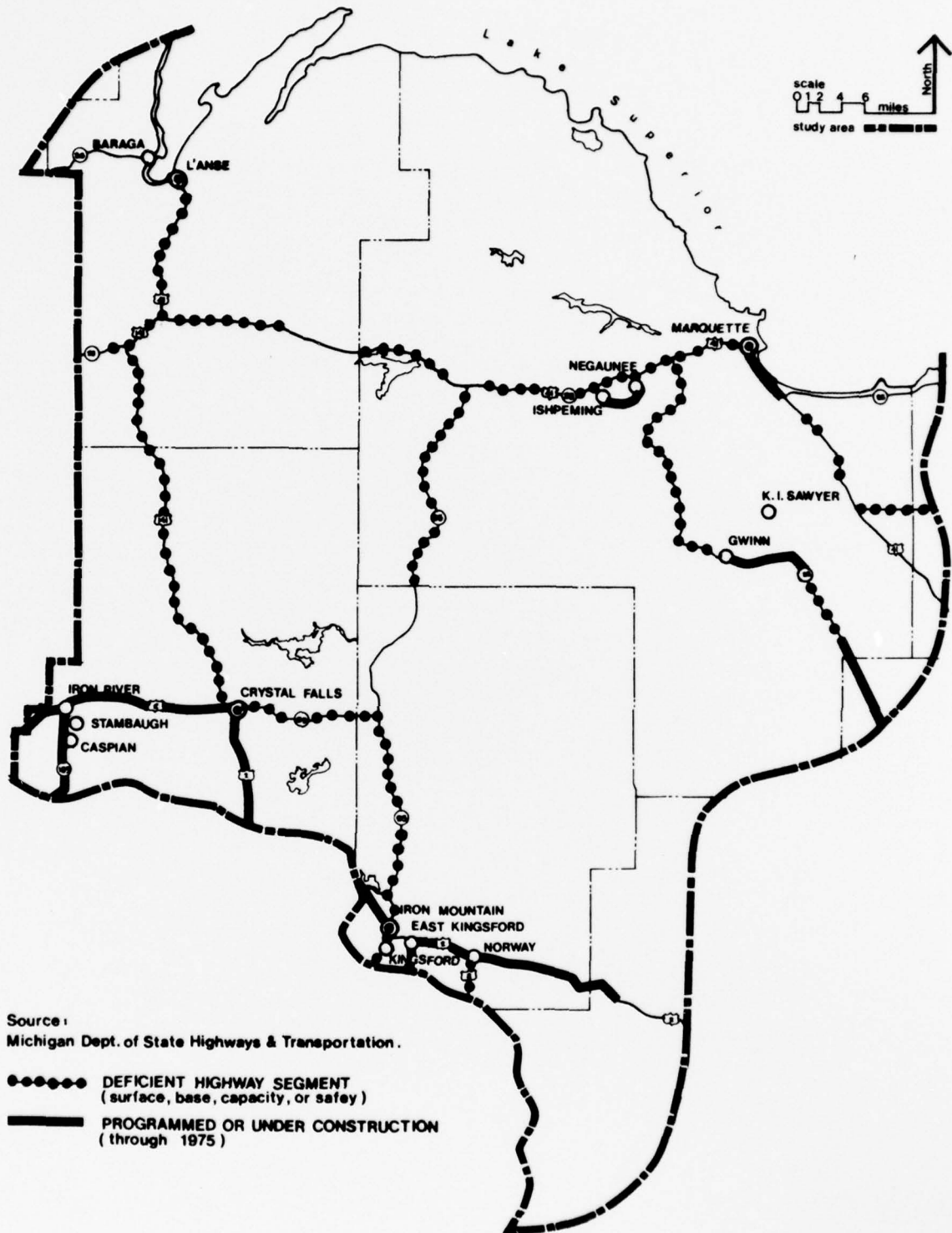
One of the methods available to measure the adequacy of road sections is called a Sufficiency Rating System. Individual segments of each trunkline are given a numerical rating using four separate factors--traffic carrying capacity, surface condition, base condition and degree of safety. The numerical aggregate of each of these four is the sufficiency rating for that segment of route. Any segment receiving a rating below an accepted minimum condition on any of these four factors is considered to have a critical deficiency with respect to that factor.

In the Western Upper Peninsula, the predominant deficient mileage is in the surface category. The surface condition is the most noticeable by motorists because of vehicle handling, riding and safety. It is also the most easily corrected. Of all deficient trunkline mileage in the Western Upper Peninsula, the capacity factor--the ability of a highway to handle traffic volumes--has the lowest number of miles rated "critical".

A highway is not adequate if it does not meet minimum requirements for any of the four categories listed below. They are as follows.

1. Traffic Capacity - This rating represents the ability of a section of highway to carry existing volumes. A capacity index is computed and then related to a table to determine the capacity rating for a section of highway. The index includes a practical hourly capacity, sight restriction, lane width and the amount of commercial traffic use of that particular road.
2. Surface Condition - The surface condition is determined by averaging the surface deterioration factor, the lane deficiency factor, and the shoulder deficiency factor, or curb factor.
3. Base Condition - The average base and drainage condition as well as the soil condition are used in determining the subsurface conditions.
4. Safety Rating - From records, recommendations and engineering judgment are compared with the accident frequency in deriving the rating for a particular highway.

The trunkline roads within the Study Area that have been rated deficient are shown in Figure 1.



## DEFICIENT TRUNKLINE ROADS MAP

Figure 1



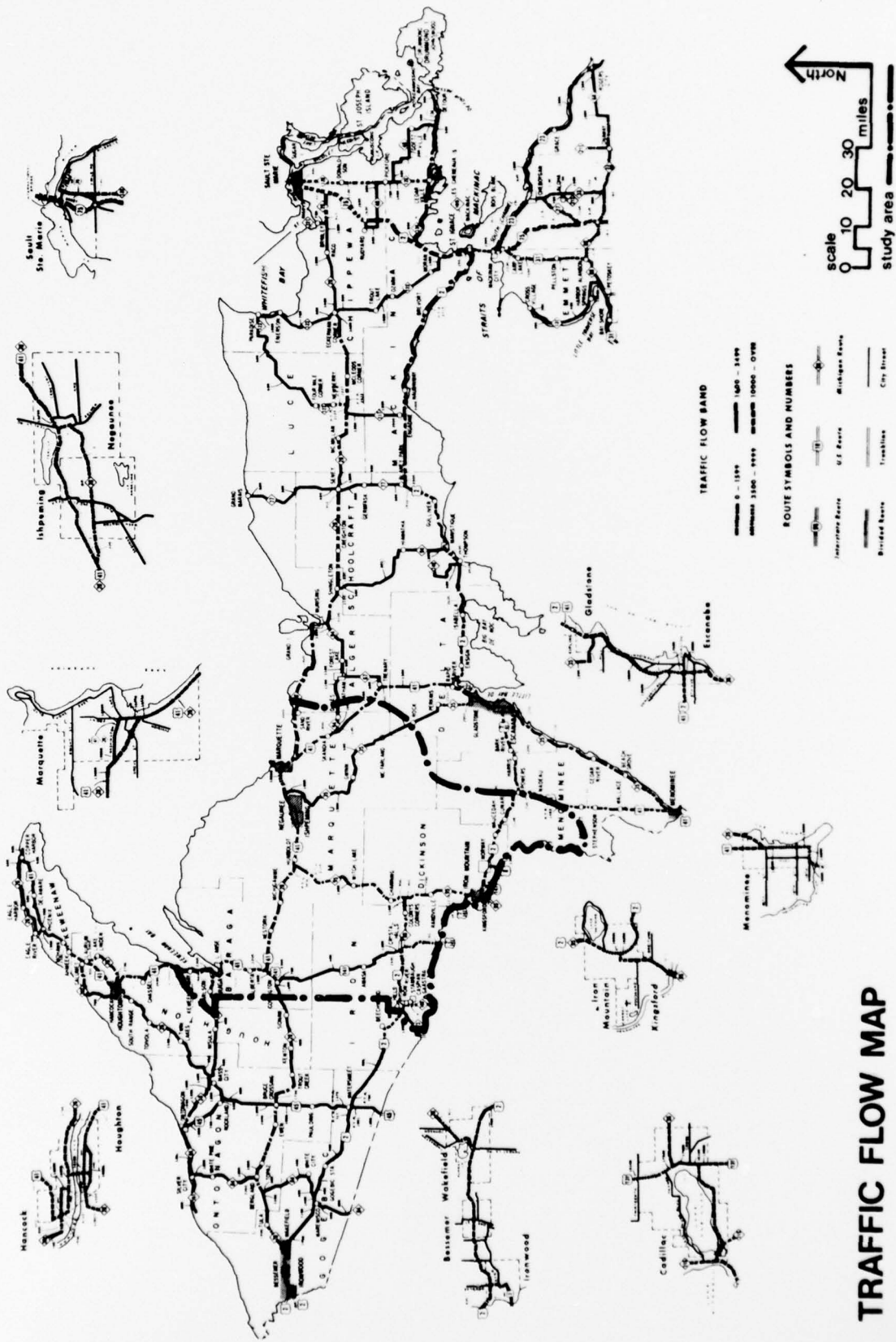


Figure 2  
42

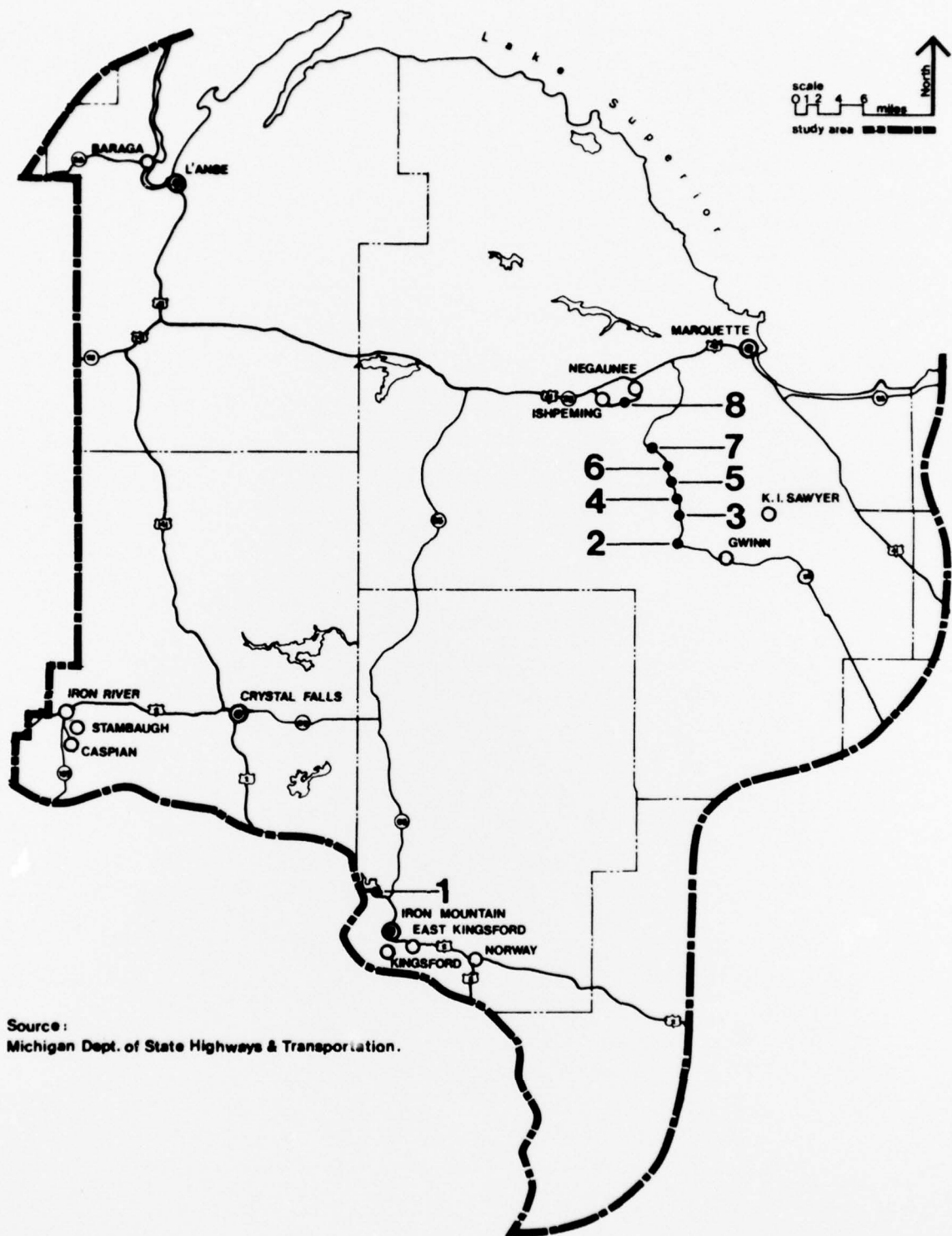
### Factors Defining a Critical Structure

A bridge is critical if it does not meet minimum requirements for any of the items considered in the sufficiency rating. The minimum requirements for each of the items are:

- I. Load Carrying Ability - According to the laws of the State of Michigan, the maximum axle load permitted on the highways of the State without special permit is 9 tons. With "H" type load distribution the vehicle axle loads would be 2.25 Tons and 9 Tons on the rear axle. The total weight of this vehicle is 11.25 tons or an H11.25 vehicle. A bridge with a Design "H" Loading of H7.5 theoretically can carry this H11.25 vehicle because a 50% overstress is allowed to figure the Operating Load Rating which is the safe load-carrying capacity of the bridge. Therefore, a bridge with a Design "H" Loading of less than H7.5, theoretically, can not carry the vehicle which is permitted to travel Michigan highways without special permit. This would constitute a critical bridge in our sufficiency rating.
- II. Traffic Capacity - Bridges which provide the required side clearances as shown in the Bridge Design Standards can adequately handle the traffic of the roadway of which it is a part. A critical situation exists when the bridge width is less than the approach width.
- III. Minimum Geometrics - According to the laws of the State of Michigan, the maximum height of vehicle, with or without load, permitted on the highways of the state without special permit is 13'-6". A bridge which does not provide this minimal vertical clearance for vehicular traffic is a critical bridge.
- IV. Condition - The Department of Highways considers the theoretical life of a concrete or steel bridge to be 50 years and timber bridges 30 years. Bridges which have passed this expected life are considered critical and are field inspected periodically.

Table 1. CRITICAL STRUCTURES IN THE STUDY AREA

Map No.	Structure Number	County	Route	Location	Deficiency	
					Loading Capacity	Traffic Capacity Condition
1	B01-22021	Dickinson	U.S. 2 U.S. 141	Menominee River at Wisconsin State Line	*	
2	B03-52032	Marquette	M35	Middle Bridge Escanaba River 6.2 miles north-west of Gwinn	*	
3	B04-52032	Marquette	M35	Green Creek 7.5 miles north-west of Gwinn	*	*
4	B05-52032	Marquette	M35	Fifteen Creek 6.0 miles south of Palmer	*	*
5	B06-52032	Marquette	M35	Sweitzer's Creek 4.1 miles south-east of Palmer	*	*
6	B07-52032	Marquette	M35	Warner Creek 3.1 miles south-east of Palmer	*	*
7	B08-52032	Marquette	M35	Warner Creek in Palmer	*	*
8	X03-52081	Marquette	M35 BR	Under Lake Superior and Ishpeming Railroad in Marquette		*



Source:  
Michigan Dept. of State Highways & Transportation.

## CRITICAL STRUCTURES MAP

Figure 3  
45



Table 2. TRUNKLINE STRUCTURES WITHIN THE STUDY AREA

Structure Number	Trunkline	Facility or Feature Crossed	Location	Spans	Type	Clear Roadway	Vertical Clearance	Load Rating	Year Built
<u>Baraga County</u>									
B02-07011	U.S. 141	Tracy Creek	1.5 miles north of Iron County Line	1-45'	SMS	38'		HS20	1960
B01-07012	U.S. 41 M28	Hickory Creek	6.5 miles west of Nostoria	1-29'	CTB	38'		HS20	1947
B02-07012	U.S. 41	Sturgeon River	1.4 miles south of Alberta	3-232'	SAO	38'		HS20	1947
B03-07012	U.S. 41	Taylor Creek	4.0 miles south of L'Anse	1-40'	SMS	38'		HS20	1951
B04-07012	U.S. 41	Falls River	In L'Anse	1-68'	SMSC	40'		HS20	1960
B05-07012	U.S. 41	Bayou and Black Water Creek	2.1 miles south-east of Baraga	2-27'	CBC	35'		H18	unknown
B01-07013	U.S. 41	Little Carp River	2 miles north of Assinins	1-28'	CAF	*91'		H15	1937
B01-07021	M28	Perch River	3.3 miles west of Watton	1-35'	SMS	30'		H15	1928
B01-07022	U.S. 141 & M28	Rock River	3.0 miles northeast of Covington	2-110'	SMSC	28'		HS20	1955
B01-07023	U.S. 41 M28	Palkie Creek	5.5 miles west of Nostoria	1-50'	SMS	38'		HS20	1947

Table 2. (Continued)

<u>Structure Number</u>	<u>Trunkline</u>	<u>Facility or Feature Crossed</u>	<u>Location</u>	<u>Spans</u>	<u>Type</u>	<u>Clear Roadway</u>	<u>Vertical Clearance</u>	<u>Load Rating</u>	<u>Year Built</u>
<u>Baraga County (Continued)</u>									
B02-07023	U.S. 41 M28	Tioga River	3.5 miles west of Nestora	1-36'	CTB	*66'6"		HS20	1947
B03-07023	U.S. 41 M28	Lake Ruth	4.8 miles west of Marquette County Line	1-35'	SMS	35'		H20	1939
X01-07023	U.S. 41 M28	Over Soo Line Railroad	8.1 miles west of Marquette County Line	3-135'	SMS	35'		H20	1940
B01-07041	M38	Sturgeon River	6.6 miles west of Baraga	3-190'	SMSC	30'		HS20	1956
<u>Dickinson County</u>									
B01-22011	M95	Menominee River	1.7 miles south of Kingsford	5-329'	PCCI	30'		HS20	1973
B01-22012	M95	West Bridge	6.8 miles south of Sturgeon River M69	1-36'	CRF	*53'10"		H15	1935
B01-22012	M95	Over Private Railroad	7.9 miles south of M69		SMSC	42'6"		HS20	1968
B01-22013	M95	Ford River	1.4 miles south of Channing	1-35'	SMS	30'		H15	1928
B01-22021	U.S. 2 & U.S. 141	Menominee River	at Wisconsin State Line	5-459'	SGF	30'		H15	1934

Table 2. (Continued)

<u>Structure Number</u>	<u>Trunkline</u>	<u>Facility or Feature Crossed</u>	<u>Location</u>	<u>Spans</u>	<u>Type</u>	<u>Clear Road- way</u>	<u>Vertical Clearance</u>	<u>Load Rating</u>	<u>Year Built</u>
<u>Dickinson County (Continued)</u>									
X01-22021	U.S. 2 & U.S. 141	Over Chicago, 0.8 miles east of Milwaukee, St. Wisconsin State Line Paul & Pacific Railroad		3-107'	SMS	30'		H15	1932
X01-22022	U.S. 2 EB	Under Chicago & Northwestern Railroad	In Norway	1-57'	SGT	42'	15'11"	E72	1954
X02-22022	U.S. 2 WB	Under Chicago & Northwestern Railroad	In Norway	1-53'	SGT	24'	15'7"		1964
B01-22023	U.S. 2	Sturgeon River	1.0 miles west of Loretto	3-195'	SMC	30'		H15	1929
X01-22023	U.S. 2	Over Chicago & Northwestern Railroad	2.6 miles east of Loretto	4-96'	CCTB	30'		H15	1923
B01-22031	U.S. 141	Menominee River	At Wisconsin State Line	6-471'	SGF	29'		H15	1929
X01-22031	U.S. 141	Under Chicago & Northwestern Railroad	0.1 miles southeast of U.S. 2	3-107'	SMS	43'	14'0"		1930
B02-22051	U.S. 8	Menominee River	In Norway	3-312'	SCMG	30'		HS20	1966

Table 2. (Continued)

<u>Structure Number</u>	<u>Trunkline</u>	<u>Facility or Feature Crossed</u>	<u>Location</u>	<u>Spans</u>	<u>Type</u>	<u>Clear Road- way</u>	<u>Vertical Clearance</u>	<u>Load Rating</u>	<u>Year Built</u>
<u>Iron County</u>									
B01-36011	M73	Brule River	At Wisconsin State Line	2-78'	CTB	23'		H15	1922
B01-36021	U.S. 2	Cocks Run River	5.3 miles southeast of Gogebic County Line	3-135'	SMS	33'		H20	1937
B02-36021	U.S. 2	South Bridge Iron River	3.0 miles northwest of M73	1-27'	CTB	35'		H15	1934
B01-36022	U.S. 2	Iron River	In Iron River	1-90'	CAF	45'		H15	1918
B02-36022	U.S. 2	Chicagoan Creek	9.1 miles west of Crystal Falls	1-31'	CTB	35'		H15	1929
B03-36022	U.S. 2	Fortune Lake Outlet	4.3 miles west of Crystal Falls	3-70'	CCS	40'		H20	1942
B01-36023	M69	Point River	In Crystal Falls	2-264'	CAD	24'		H15	1924
B02-36023	M69	Michigamme River	5.8 miles east of Crystal Falls	3-150'	SMS	30'		H15	1931
B01-36031	M189	Brule River	At Wisconsin State Line	2-124'	SGF	22'		H15	1931
B01-36051	U.S. 2 & U.S. 141	Brule River	At Wisconsin State Line	3-165'	SMS	35'		H20	1940
B02-36051	U.S. 2 & U.S. 141	Dunn Creek	1.8 miles south of Crystal Falls	1-23'	CTB	36'		H15	1936



Table 2. (Continued)

Structure Number	Trunkline	Facility or Feature Crossed	Location	Spans	Type	Clear Road- way	Vertical Clearance	Load Rating	Year Built
<u>Iron County (Continued)</u>									
B04-36052	U.S. 141	East Bridge Nat River	4.0 miles south of Baraga County Line	3-126'	SMSC	28'		HS20	1961
B07-36052	U.S. 141	Point River	4.0 miles northwest of Crystal Falls	3-208'	PCIC	42'6"		HS20	1970
<u>Marquette County</u>									
B01-52011	M95	Michigamme River	0.2 miles north of Dickinson County Line	3-195'	SMS	33'		H20	1938
B02-52011	M95	Trout Falls Creek	9.8 miles south of U.S. 41	3-129'	SMS	30'		HS20	1958
B03-52011	M95	Michigamme River	6.9 miles south of U.S. 41	4-260'	SMSC	30'		HS20	1958
B04-52011	M95	Black River	3.2 miles south of U.S. 41	1-39'	CTB	*46'		H20	1942
B01-52011	M94	Nelson Creek	1.6 miles east of U.S. 41	1-30'	CTB	38'		HS20	1953
B01-52032	M35	East Bridge Escanaba River	In Gwinn	1-70'	SMG	35'		H20	1940
B03-52032	M35	Middle Bridge Escanaba River of Gwinn	6.2 miles northwest of Gwinn	1-104'	STT	16'10"		H15.1	1918
B04-52032	M35	Green Creek	7.5 miles northwest of Gwinn	1-28'	SMS	19'		H9.4	unknown

Table 2. (Continued)

Structure Number	Trunkline	Facility or Feature Crossed	Location	Spans	Type	Clear Roadway	Vertical Clearance	Load Rating	Year Built
<u>Marquette County (Continued)</u>									
B05-52032	M35	Fifteen Creek	6.0 miles south of Palmer	1-28'	SMS	19'		H11.3	unknown
B06-52032	M35	Sweitzer's Creek	4.1 miles southeast of Palmer	1-45'	CGT	18'		H15	1920
B07-52032	M35	Warner Creek	3.1 miles southeast of Palmer	1-45'	CGT	18'		H15	1920
B08-52032	M35	Warner Creek	In Palmer	1-45'	CGT	18'		H15	1920
B09-52032	M35	Warner Creek	In Palmer	1-45'	SMSC	38'6"		H20	1964
B11-52032	M35	Middle Bridge Escanaba River	1.2 miles west of Winn	3-201'	SMSC	2 @ 22'		HS20	1967
X04-52032	M35	Over Chicago & Northwestern Railroad and Goose Lake	4 miles northeast of Palmer	4-262'	SMSC	30'		H20	1965
B01-52041	U.S. 41 M28	Peshekee River	2.3 miles west of Champion	4-240'	SMSC	30'		HS20	1930
B02-52041	U.S. 41 M28	Escanaba River	2.5 miles east of M95	2-60'	SMS	30'		H15	1929
B03-52041	U.S. 41 M28	Carp River	3.9 miles west of Ishpeming	1-24'	CTB	42'		HS20	1947
B04-52041	U.S. 41 M28	Carp River	In Ishpeming	1-36'	CTB	35'		H15	1936

Table 2. (Continued)

Structure Number	Trunkline	Facility or Feature Crossed	Location	Spans	Type	Clear Road- way	Vertical Clearance	Load Rating	Year Built
Marquette County (Continued)									
X01-52041	U.S. 41 M28	Under Lake Superior and Ishpeming Rail- road	0.2 miles east of M28 BR	3-118'	SGT	40'	13'10"		1936
B01-52042	U.S. 41 M28	Carp River	1.3 miles west of M35	3-110'	SMS	2 @ 38'		HS20 NB HS20 SB	1955 1958
B02-52042	U.S. 41 & M28	Carp River	In Marquette	1-92'	SMSC	64'		HS20	1973
P01-52042	U.S. 41	At U.S. 41	0.4 miles west of Junction M28	1-93'	STT	24'	17'3"		1972
S01-52042	U.S. 41 M28	Under Altamont Street	In Marquette	3-173'	SMSC	2 @ 24'u 28'o	18'0"HB 17'1"SB	H15	1963
S02-52042	U.S. 41 M28	Under Champion Street	In Marquette	3-199'	SMSC	2 @ 24'u 28'o	14'10"HB 15'0"SB	H15	1963
X01-52042	U.S. 41 M28	Under Lake Superior and Ishpeming Railroad	3.5 miles west of Marquette	2-86'	SGT	2 @ 38'6"	14'3"EB 14'5"WB		1956
X03-52042	U.S. 41	Under Soo Line Railroad	In Marquette	3-248'	SMG	2 @ 24'u	16'1"NB 18'6"SB	E70	1963
B01-52043	U.S. 41	Cherry Creek	0.9 miles south- east of M28	1-24'	CTB	*71'8"		HS20	1952

Table 2. (Continued)

Structure Number	Trunkline	Facility or Feature Crossed	Location	Spans	Type	Clear Roadway	Vertical Clearance	Load Rating	Year Built
<u>Marquette County (Continued)</u>									
B02-52043	U.S. 41	Big Creek	2.1 miles south-east of M28	3-111'	SCMS	38'		HS20	1952
B04-52043	U.S. 41	Chocolay River	7.5 miles south-east of M28	2-90'	SMSC	38'		HS20	1954
B08-52043	U.S. 41	Nelson Creek	4.9 miles northwest of Alger County Line	2-23'	CCBC	*79'		H15	1939
X01-52043	U.S. 41	Over Lake Superior and Ishpeming Railroad	4.6 miles northwest of Alger County Line	3-134'	SMS	33'		H20	1937
X01-52044	U.S. 41 BR	Under Soo Line Railroad	In Marquette (south Front Street)	1-70'	SGF	42'	33'10"		1936
B01-52061	M28	Chocolay River	1.1 miles east of U.S. 41	3-135'	SMS	33'		H20	1937
X01-52061	M28	Over Lake Superior and Ishpeming Railroad	0.7 miles east of U.S. 41	3-166'	SMS	33'		H20	1938
X02-52061	M28	Under Soo Line Railroad	1.5 miles east of U.S. 41	1-106'	SCT	47'	14'9"		1938

Table 2. (Continued)

<u>Structure Number</u>	<u>Trunkline</u>	<u>Facility or Feature Crossed</u>	<u>Location</u>	<u>Spans</u>	<u>Type</u>	<u>Clear Road- way</u>	<u>Vertical Clearance</u>	<u>Load Rating</u>	<u>Year Built</u>
<u>Marquette County (Continued)</u>									
X01-52081	M28 BR	Under Soo Line and Chicago and Northwestern Railroads	In Negaunee (Silver Street)	2-103'	SMS	40'	13'11"		1936
X02-52081	M28 BR	Under Lake Superior and Ishpeming Railroad	In Negaunee (North Teal Lake Avenue)	1-47'	SGT	20'	17'3"		1908
X03-52081	M28 BR	Under Lake Superior and Ishpeming Railroad	In Ishpeming	4-198'	SGT	29'6"	22'3"		1910
<u>Menominee County</u>									
B01-55011	U.S. 41	Menominee River	Wisconsin State Line	13-849'	SMG	44'		H15	1929
B02-55011	U.S. 41	Little River	3.0 miles south of Carbondale	1-35'	SMS	30'		H15	1929
X01-55011	U.S. 41	Over Chicago & Northwestern & Chicago, Mil- waukee, St. Paul & Pacific Rail- roads	In Menominee	4-150'	CTB	40'		H15	1929



Table 2. (Continued)

<u>Structure Number</u>	<u>Trunkline</u>	<u>Facility or Feature Crossed</u>	<u>Location</u>	<u>Spans</u>	<u>Type</u>	<u>Clear Road- way</u>	<u>Vertical Clearance</u>	<u>Load Rating</u>	<u>Year Built</u>
<u>Menominee County (Continued)</u>									
B01-55012	U.S. 41	Hays Creek	0.1 miles south of Daggett	1-27'	CTB	35'		H15	1934
B01-55021	U.S. 2	Big Cedar River	1.3 miles northeast of Powers	1-45'	SMS	33'		H20	1937
B02-55021	U.S. 2	Big Cedar River	0.4 miles northwest of Powers	1-45'	SMS	40'		H15	1933
X01-55021	U.S. 2	Over Soo Line Railroad	4.0 miles northwest of Powers	3-128'	SMS	33'		H20	1936
X02-55021	U.S. 2	Under Chicago & Northwestern Railroad	In Powers	3-108'	SMS	40'	14'3"		1933
B01-55022	U.S. 2 & U.S. 41	Cedar River	0.6 miles east of Powers	1-45'	SMS	40'		H15	1932
B02-55022	U.S. 2 & U.S. 41	Wilson Creek	4.2 miles east of Powers	1-34'	CTB	35'		H15	1931
B03-55022	U.S. 2 & U.S. 41	47 Creek	4.2 miles west of Delta County Line	1-31'	CTB	35'		H15	1931
B01-55031	M35	Big Cedar River	0.2 miles north of Cedar River	5-350'	SMSC	32'		HS20	1952
B02-55031	M35	Deer Creek	6.3 miles northeast of Cedar River	1-27'	CTB	35'		H15	1933

